

and voluntary observers show that the first snow of the season fell at Choteau and Fort Logan, Mont., on the 5th; at Camp Sheridan, Wyo., on the 6th; at Fort Shaw and Camp Poplar River, Mont., and Napoleon and New England City, N. Dak., on the 11th; at Fort Pembina and Wild Rice, N. Dak., Webster, S. Dak., Fergus Falls, Minn., and Butternut, Wis., on the 12th; at Steele, N. Dak., on the 13th; and at Tyler's Creek, W. Va., on the 28th. Snow fell at Mount Washington, N. H., on the 23d, 24th, and 28th.

Monthly snowfall was reported as follows: *Arizona*.—Fort Huachuca, trace. *Colorado*.—Climax, 8.2; Breckenridge, 5.0. *Idaho*.—Henry's Lake, 0.1. *Montana*.—Blackfeet Agency, 17.0; Choteau, 6.0; Fort Logan, 2.0; Fort Custer, 0.5; Fort Shaw, trace. *North Dakota*.—Fort Pembina, New England City, and Steele, 2.0; Davenport and Gallatin, 0.5; Fort Yates, trace. *South Dakota*.—Webster, 0.2. *West Virginia*.—Tyler's Creek, 0.2. *Wyoming*.—Camp Sheridan and Fort Washakie, trace.

## HAIL.

Description of the more severe hail storms of the month is given under "Local storms." Hail was reported as follows: 1st, Iowa, Mont. 2d, Colo., Ind. T., Wash. 3d, Ariz., Colo., N. Dak. 5th, Minn., Nebr., N. Mex., N. Y., Ohio. 6th, Ariz., Iowa, Kans., Nebr. 7th, Ariz. 8th, S. C. 9th, Kans. 10th, S. Dak. 11th, Nebr., N. Dak., S. Dak. 12th, Iowa, Kans., Minn., S. Dak. 13th, N. Mex. 14th, Kans., La., Tex. 15th, Mich. 16th, Mich., N. Y., Pa. 18th, Iowa, Kans., Mich., Mo. 19th, Kans., Mich., Tenn. 20th, Colo. 21st, Colo. 22d, Ariz. 23d, N. Y., Vt. 24th, Colo. 25th, Kans. 26th, Cal., Colo., Ind. T. 28th, Ga. 30th, Ariz., Wash.

## SLEET.

Sleet was reported at Moorhead, Minn., Flandreau and Huron, S. Dak., on the 12th; in Minn. on the 13th and 14th, and in Colo. on the 28th.

## WINDS.

The prevailing winds during September, 1890, are shown on chart II by arrows flying with the wind. In New England the winds were mostly from southwest to northwest; in Virginia and the south Atlantic states, northeast; over the Florida Peninsula, south to east; in the east Gulf states, north to east; in the west Gulf states, northeast to southeast; in the Ohio Valley and Tennessee, northeast, except in the upper Ohio valley, southerly; in the lower lake region and on the northeast slope of the Rocky Mountains, southeast to southwest; in the upper Mississippi valley, northwest to northeast; in the Missouri Valley, southerly; over the southern plateau, south to west; over the northern plateau, south to southwest; on the middle and south Pacific coasts, west to northwest; and in the middle Atlantic states, the upper lake region, the extreme northwest, on the middle-eastern and southeast slopes of the Rocky Mountains, over the middle plateau region, and on the north Pacific coast, variable.

## HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Signal Service, as follows: 6th, 50, nw., at Fort McKinney, Wyo. 29th, 63, ne., at Kitty Hawk, N. C. 30th, 69, nw., at Mount Washington, N. H.

## LOCAL STORMS.

1st.—A severe hail storm occurred at Bancroft, Iowa. In Seneca township, west of Bancroft, the hail drifted to a depth of 18 inches. During a heavy thunder-storm lightning struck a barn near Alta, Iowa; loss \$1,000. A very heavy rain storm in the afternoon flooded streets in Ashland, Wis. 5th.—A heavy thunder-storm passed over Long Island in the evening and some damage was caused by lightning. Heavy rain in Ritchie Co., W. Va., flooded small streams. Severe thunder-storms occurred in central and south-central Illinois in the evening, and 2 persons who had sought shelter under trees were reported killed by lightning. During a thunder-storm at Alta, Iowa, lightning struck a drug store, setting it on fire, and damaging the building and stock to the extent of about \$2,500. Lightning also struck another house in Alta, stunning the inmates. During a thunder-storm at Canton, S. Dak., lightning struck a barn near that place, which, with its contents, 62 tons of hay, was burned. A heavy hail storm in the evening caused considerable damage at Devil's Lake, N. Dak. 6th.—A severe storm moved eastward over Jackson Co., W. Va., about 5 p. m., local time, destroying several buildings and damaging other property.

7th.—A thunder-storm, with heavy rain, visited Parkersburgh, W. Va., in the morning; many cellars were flooded; in the country small streams overflowed their banks, and the Ohio and Kanawha rivers were rising rapidly as the result

of heavy rain in that section. During a heavy thunder-storm a barn near Wauseon, Ohio, was struck by lightning and burned. A heavy wind and rain storm in the afternoon caused considerable damage in Paxton, Ill., and vicinity. A heavy rain storm, with thunder, commenced at Abilene, Tex., at 7 p. m., eastern time. The storm was attended by high wind; 3.90 inches of rain fell in 13 hours, flooding cellars, etc. 8th.—About noon lightning struck a building in Altoona, Pa., occupied by the Pennsylvania R. R. Co.; the building was set on fire, causing a heavy loss. Lightning also struck another house in Altoona, injuring several persons. An unusually heavy rain storm was reported at Bucyrus, Ohio. 9th.—A storm, causing considerable damage, was reported near Goshen, Ind. 9-10th.—At South Canisteo, N. Y., an excessive rainfall of 6.48 inches in 24 hours occurred, destroying crops and washing away bridges. The heavy rain also caused floods in Schuylar and Chemung counties, N. Y., resulting in washouts and landslides on railroads, washing away of bridges, etc. 10th.—A cloud burst was reported about 15 miles from Del Rio, Tex., in the evening; the volume of water caused a wash-out on the Southern Pacific Railroad in which a passenger train was wrecked. Considerable damage was also reported near Eagle Pass, Tex., by the sudden rise and overflow of a mountain stream, the Rio Escondido. 11th.—About 8 p. m. a severe electrical storm passed over Ellicott City, Md. A thunder-storm, with heavy rain, caused some damage at York, Pa. Heavy rain had swelled the streams and caused great damage to railroad and other property in Chemung, Steuben, Onondaga, Allegany, Tomkins, and Livingston counties, N. Y. Heavy rain caused much damage in northern Ohio; streams were unusually high, and great destruction was reported throughout Summit county. 12th.—Heavy rain continued in western and central New York. The Black River was swelled to nearly the height of the usual spring freshet. The Genesee River was rising rapidly. At Ilion, N. Y., the Mohawk River was over its banks and flats were covered with water. At Syracuse the water in Onondaga Lake rose rapidly, and the grounds of the New York State Fair were flooded. Heavy rain caused heavy losses by flood and landslides in northern West Virginia. A violent wind and rain storm caused considerable damage in Jackson and Independence counties, Ark., in the afternoon.

13th.—A heavy thunder and rain storm occurred at night in Carroll Co., Md.; bridges were washed away, lowlands flooded, and crops destroyed. Floods, resulting from heavy rain, continued in central and western New York. Damage to the extent of many thousands of dollars was done in the north and west parts of Lewis county, where mills, dams, bridges, and houses were swept away. Damaging floods were

reported along the streams of northern and western Pennsylvania, and northern and eastern Ohio. The observer at Marquette, Mich., reports that during a storm of high westerly winds, rain, and flurries of snow, the schooner "Comrade" was wrecked, and the crew, consisting of eight men, drowned. A moderate thunder-storm passed over Abilene, Tex., in the morning, during which a house was struck by lightning and considerably damaged. 15th.—A severe thunder-storm prevailed at Jacksonville, Fla., from 2.15 to 7.30 p. m., during which a flagstaff on the Everett Building was struck by lightning and demolished. A thunder-storm, with heavy rain, occurred in the evening at Palestine, Tex., and lightning caused some damage to buildings. 16th.—A very heavy thunder-storm swept over Long Island in the morning; telegraph poles were shattered and several buildings were struck by lightning. The storm was also very severe over Rhode Island and south-east Massachusetts, where the rainfall was excessive, and several persons were killed and much damage was caused by lightning. A cloud-burst occurred about a mile north of Le Roy, Pa., in the evening, causing damage to roads, fences, etc. At Key West, Fla., a heavy thunder-storm, moving from the northeast, set in 9.55 p. m., eastern time, with a squall of wind which attained a velocity of 37 miles per hour. A house was struck and considerably damaged by lightning. 17th.—A thunder-storm began at New York City at 7.50 a. m., eastern time, and ended 11.40 a. m., and from 7.52 to 7.57 a. m., 5 minutes, 0.35 inch of rain fell. Considerable damage was done in the lower part of the city and in the eastern part of Brooklyn, by flooding of cellars, etc., and in Jersey City a telephone office was struck by lightning and damaged to the extent of about \$5,000. Great damage was caused by floods resulting from heavy rain in parts of Connecticut. Heavy rain, attended by peals of thunder in the east, began at Yuma, Ariz., at 8.40 a. m., and lasted 25 minutes, during which time 0.64 inch of rain fell. The heavy rain caused washouts on the railroad a few miles east of Yuma.

18th.—Crops in Monmouth Co., N. J., were reported badly damaged by heavy rains and severe gales. In the afternoon a heavy storm, with lightning and high wind, prevailed over a large portion of Iowa, and caused considerable damage in localities. Near Manilla, Crawford Co., Iowa, a wind storm from sw., with heavy rain, occurred about noon. The storm,

which lasted but a few minutes, demolished a residence and out-houses 2 miles east of Manilla and killed one person. A heavy rain and thunder-storm occurred at Vinton, Iowa; damage \$1,000. At West Bend, Iowa, some damage was caused by lightning. At Alta, Iowa, several head of cattle were killed, and a number of children in a school-house were stunned by lightning. At Fayette, Iowa, a severe storm occurred about 5 p. m., unroofing a house, and completely demolishing a farm house. A heavy thunder and hail storm occurred at Wakefield, Kans., at 4.25 p. m. The hail was of unusual size. At Tampa, Fla., a severe thunder and rain storm began 5.15 p. m., eastern time, with brisk sw. wind. Hail fell in the north part of the town, and one man was stunned and a cow killed by lightning. 20th.—A severe wind and hail storm was reported in the lower part of Pulaski Co., Ga., in the afternoon. 21st.—A severe thunder-storm in the morning was reported at Palmetto, Ga., during which a dwelling was struck by lightning. 22d.—At Tampa, Fla., a heavy rain in the evening flooded the streets and rendered them almost impassable. Heavy rain flooded streets and caused great damage to Hot Springs, Ark. A severe wind storm was reported at Dresden, Navarro Co., Tex., in the afternoon. A very severe hail storm occurred at Strawberry, Ariz., and it was reported that hail lay in drifts 1 to 1½ feet deep 5 days after the storm. 23d.—A destructive rain storm was reported at Helena, Ark., in the evening; streets and houses were flooded. 24th.—At Memphis, Tenn., rain began 2.10 p. m., and in 36 minutes 1.35 inch fell; crops were damaged in that vicinity. 25th.—Heavy rain and a ne. to e. gale prevailed at Wilmington, N. C., damaging cotton and causing small washouts on railroads. 27th.—During a thunder-storm in the afternoon at Tampa, Fla., a dwelling was struck by lightning and set on fire. 29th.—Heavy rain in the afternoon caused great damage to raising grapes near Fresno, Cal.; the damage being estimated at \$500,000.

#### WATER-SPOUTS.

A water-spout, presenting a beautiful appearance, and moving from southeast to northwest, was observed about 4 miles west of Hatteras, N. C., at 8 a. m. of the 25th, during a heavy rain storm. A second and incomplete water-spout, extending about half way from the cloud to the water, formed near where the first one appeared at 8.05 a. m.

### INLAND NAVIGATION.

#### FLOODS.

From the 10th to 13th great damage was caused by the overflow of streams in central and western New York. The Che-mung River and tributaries were swelled, causing an overflow and considerable damage at Elmira. The Canisteo River flooded its banks at Canisteo. The overflow of the Mohawk River flooded thousands of acres of meadow and tilled land. The Cohocton River overflowed its banks at several points, causing landslides, washouts on railroads, and other damage. At Ithaca the fair ground was flooded and much live stock drowned. The Genessee River was greatly swelled. The Black and Salmon rivers, and small streams in Oswego county, were very high. On the 14th a 7-foot freshet was reported in the Hudson River at Albany. In Pennsylvania the tributaries of the Allegheny River were reported high and overflowing. At New Castle the lower part of the city was flooded, and the Neshannock River was over its banks. At Bradford both branches of the Tuna River overflowed, flooding the lower streets, and causing washouts on railroads. The Susquehanna River rose to an unusual height at Wilkes Barre, flooding lowlands. At Harrisburg the river rose 7 feet on the 13th. In West Virginia high water and much drift-wood was reported at Parkersburgh on the 7th and 12th to 16th. On the 12th the Ohio river rose 4 feet 7 inches at that place. A sud-

den rise in the Gawley River carried away 31 loaded coal barges at Charleston, 11 of which were lost. On the 12th and 13th the Little Kanawha River rose rapidly, causing much damage. In Ohio the Scioto River had risen to a dangerous height on the 12th, causing considerable damage to property and loss of live stock. At Columbus the stage of the water was one foot below that of last May, when the river began to fall. The Sandusky River was very high. The Tuscarawas River rose rapidly, flooding the valley. At Cincinnati large quantities of drift-wood were observed on the 14th, and the Ohio River had risen over 3 feet in 24 hours at that point. Drift-wood was also reported at Cincinnati on the 16th and 17th. Great damage was reported in the Muskingum Valley by high water. The Hocking River rose rapidly, doing much damage. Considerable drift-wood was reported in the Ohio River at Cairo, Ill., on the 20th. High water carried away many bridges in Connecticut about the middle of the month. From the 10th to 12th considerable damage was caused by flooding of streams near Eagle Pass, Tex. The Rio Grande River was reported over its banks at Eagle Pass, causing much damage to railroad and other property.

#### LOW WATER.

In parts of Missouri, Iowa, Kansas, Nebraska, South Dakota, and Minnesota streams were reported very low, and in some instances, dry.